DETERMINING THE ABILITIES OF THE BIRMINGHAM FIRE AND RESCUE SERVICE TO MANAGE A MAJOR HIGH RISE FIRE

STRATEGIC MANAGEMENT OF CHANGE

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ABSTRACT

The problem identified for this applied research project was that the Birmingham Fire and Rescue Service had never been evaluated as to its abilities to handle a major high rise fire. It was the author's purpose in preparing this study to determine whether the department could handle a major high rise fire, and if not, what could be done to prepare the department for this type an incident. The historical research method was used in collecting data.

The procedures used to collect data relative to this study included a literature review, personal interviews, and a 25 question survey. The literature search was conducted at the National Fire Academy's Learning Resource Center (LRC).

The research questions that were identified are:

1. Do department personnel have the knowledge, experience, and training to successfully use the Incident Management System to handle a major high rise fire?
2. Do department personnel have the knowledge, experience, and training to use correct strategies and tactics on a major high rise fire?
3. Do department personnel have the knowledge, experience, and training to know the safety issues at a major high rise fire?

A survey was conducted of 100 members of the Birmingham Fire and Rescue Service. The survey included questions on knowledge, experience, and training. The results were analyzed to determine what patterns and relationships existed.

The results of this study indicated that the department's use of the Incident Management System was good. The issue of strategies and tactics was unclear. Safety issues were satisfactory but lacking.

The department could handle a serious major high rise fire but woefully fell short in many areas.

Recommendations included making High Rise Policy more comprehensive, developing a high rise training package, and information packets for individual buildings. Department training should concentrate on this type of fire.

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INTRODUCTION

The scope of the research contained within this paper is limited to the question of whether or not the Birmingham Fire and Rescue Service is prepared to handle a major high rise fire.

High rise fires due to their size and scope quickly drain department resources and put everyone at a much higher safety risk. Once inside these buildings beyond the reach of fire department ladders and most normal escape routes, firefighters must have the knowledge, experience, and training to keep them safe. The study focus was on the Incident Management System, strategies and tactics, and safety issues. They are the vital keys to safety and effectively managing high rise fires. Including all aspects of high rise fires would have been too broad and unmanageable for this paper.

The problem was that the Birmingham Fire and Rescue Service had never been evaluated as to its abilities to handle a major high rise fire.

The purpose in preparing this research paper was to determine whether or not the department could handle a major high rise fire. If there were shortcomings or problems, what could be done to prepare the department for an incident of this type?

The historical research method was used to gather information for this project. The research consisted of a literature review, personal interviews, and a survey that was answered by members of the department. Articles and materials were obtained from the National Fire Academy's Learning Resource Center (LRC). Several high rise polices were solicited from other fire departments across the country.

The research questions that were identified are:

1. Do department personnel have the knowledge, experience, and training to

successfully use the Incident Management System to handle a major high rise fire?

2. Do department personnel have the knowledge, experience, and training to use correct strategies and tactics on a major high rise fire?

3. Do department personnel have the knowledge, experience, and training to know the safety issues at a major high rise fire?

BACKGROUND AND SIGNIFICANCE

The City of Birmingham is the largest city in the state of Alabama. It has a population of 265,000 in 1999 and an area of approximately 163 square miles. The population of the downtown area increases dramatically during business working hours. This increase is due to the large number of businesses and large buildings which operate downtown.

The Birmingham Fire and Rescue Service is a career department providing a full range of emergency services. Equipment that is routinely in service on a daily basis are 29 engine companies, three truck companies, two quint companies, ten ALS transport units, five airport crash trucks, a hazardous materials unit and command vehicle, decontamination unit, and a high angle/confined space rescue squad. The department has 684 personnel operating from 30 fire stations. There is a daily average manning of 153 personnel with four on-duty battalion chiefs.

Before beginning a discussion about high rise buildings and high rise firefighting, it becomes necessary to define a high rise building. "A high rise building is a structure that has a height above the ground of 75 feet or more. However, you should note that some buildings that are less than 75 feet

present the same problems as ones over 75 feet" (National Fire Service Incident Management System Consortium Model Procedures Committee, 1995, p-65). Birmingham has dozens of buildings particularly in the downtown area that qualify as high rise buildings. Many of these buildings are office space and have large numbers of people who work in them. On the south side of downtown, there is a complex which contains an urban university and several hospitals which covers many square blocks. Most of these buildings are considered high rise.

The problem of high rise fires is a serious one. "In 1995 alone 10,000 structure fires were reported in U.S. high rise buildings in four property classes combined. Together, these fires killed 55 people, injured 688, and caused $44.5 million in direct property damage" (Hall, 1997, p. 84).

"The Birmingham Fire and Rescue Service answered 47,002 calls in 1998, of those calls 10,269 were fire calls. Of the 10,269 total fire calls 650 were to high rise buildings" (Birmingham Fire and Rescue Service, 1998, p. 1). The vast majority of these high rise calls were some type of system malfunction. However, there is a very real threat of having a major high rise fire. In the event of a high rise fire, the department must be ready and prepared to meet the challenge. If it is not, the results could be disastrous.

This paper is relevant to the Executive Development Course in that several sections of the course were incorporated in finding solutions. Module two was a guiding factor in looking at the organization and analyzing existing conditions and assessing what changes need to be made. The other change modules were helpful in recognizing the change barriers.

LITERATURE REVIEW

There are few incidents that are as gut wrenching to fire commanders as high rise fires. The size and complexity of these fires are extremely taxing to people and resources. The potential for disaster in loss of lives and property is paramount in the incident commander's mind. A department that has responsibility for high rise buildings must evaluate itself on its abilities to successfully handle these fires and avoid disaster.

The Interstate Bank high rise fire in Los Angeles, California in 1988 once again brought news to the world that high rise buildings are not invulnerable to fire. The incident demonstrated how easily a small fire originating on the twelfth floor quickly consumed combustible fuel to spread horizontally and vertically through wall and floor openings. The fire had consumed four floors to the sixteenth floor before firefighters, jeopardizing their own personal safety in the firefighting effort, were able to bring the inferno under control (Klem, 1989, p. 85).

On February 23, 1991, in Philadelphia, Pennsylvania, a fire on the 22nd floor of the 38 story One Meridian Plaza high rise office building across from the city hall could not be extinguished by exhausted firefighters working inside the building. Three firefighters died in the blaze when they ran out of air in their breathing apparatus and became disoriented and trapped on the 28th floor of the building (Klem, 1991, p. 12).

"The One Meridian Plaza fire was the largest high rise fire in the history of the United States. The incident went to 12 alarms involving the commitment of 51 engines, 15 ladder companies and 11 specialized units" (Chubb, Jennings, & Routley, 1991, p. 3).

"The fire was eventually under the overall command of the Fire Commissioner assisted by 11

battalion chiefs and 15 other chief officers. A total of approximately 316 personnel were committed to the fire which lasted 19 hours" (Chubb, Jennings, & Routley, 1991, p. 3).

"One of the most serious high rise fires in terms of lives lost in the United States in recent times was the MGM Grand Hotel fire in Las Vegas, Nevada in 1980. The MGM fire caused 85 deaths and 600 injuries" (Best & Derriers, 1982, p. 20).

If there continues to be high rise fires, a department must ask if it can we handle a major high rise fire. When evaluating this process, we must determine what are the most critical parts to evaluate. There are no easy answers or solutions when dealing with high rise fires. Most of the materials agree that a good command system is an essential function.

Incident Management System

Fire in high rise buildings places unique demands upon the fire service. The large floor areas, the height of the buildings, the large number of occupants and complex building support systems all require that the fire service establish procedures to command, control and coordinate our operations at fires within these buildings (New York Fire Department, 1974, p. 39).

The purpose of command at an incident is to ensure efficient use of resources, provide a plan of action, and to establish support functions. If properly established and used, the safest and most effective operations (under the circumstances) are achieved (Denver Fire Department, 1993, p. 16).

"The Incident Command System is of significant importance in high rise situations. Due to the number of fire companies that high rise operations require, and the complexity of these operations, close supervision has been determined to be necessary" (Coffman, 1997, p. 10).

"These fires place a great strain on an incident command system. The necessary procedures for command, control, coordination, and the communications must be developed, perfected, and practiced well in advance of an incident" (Chapman, 1995, p. 67).

High rise fires are very different from non high rise fires, however basic strategies are similar. Live safety, confine the fire, and protect property are still the same. However, some strategies and most of the tactics are very different.

Strategies and Tactics

It is essential to discern the different and separate concepts of strategy, tactics, and logistics at the outset of a large fire incident. This is especially crucial at fires in large, complex high rise buildings, where search, evacuation, and attack operations must be executed by well thought out plans (Chapman, 1995, p. 67).

"Successful high rise firefighting depends not so much on wise strategy, but rather on the total quality of all the tactical efforts applied to implement what are often very few and very fundamental strategic concepts" (Mendes, 1975, p. 26).

"The strategy and tactics employed during an emergency in a high rise building will be successful dependent on the knowledge possessed by officers and members as to the design and construction features of that building" (Los Angeles County Fire Department, 1990, p. 4).

The last and the most important part of the evaluating puzzle has to be the safety issues for occupants and firefighters. After all, buildings can be replaced; the lives of fire victims cannot.

Safety Issues

There are a myriad of safety issues at high rise fires not only for occupants and firefighters, but

for support personnel and onlookers as well. Richter (1995) wrote that because of falling glass and other debris, a safety perimeter of 200 feet should be established around the building.

A high rise building may have large numbers of people in it. Evacuating everyone out of the building takes a considerable amount of time. "Total evacuation is not practical. The time required to evacuate 1,000, 2,000 or even 4,000 people would be prohibitive. The establishment of safe refuge areas is the answer" (Los Angeles County Fire Department, 1990, p. 8).

Firefighters responding to fires in high rise buildings must realize that the elevator is a deadly trap during a fire. Regardless of whether the elevator is equipped with an emergency mode "firefighter service" or not, firefighters must use extreme caution when using an elevator during a fire (Dunn, 1994, p. 20).

Richter (1995) states that when attacking the fire floor one should check the floor layout on the floor below the fire floor, make standpipe connections in a safe area but close to the fire, flake hose up the next stairs for ease of pulling, check the door for heat, check ceiling tiles for fire as one advances toward the fire.

Personal protective equipment shall consist of the required bunking clothes, complete with helmet, gloves, hood, boots, pants, and coat. Additionally, all members should have a PASS device and self-contained breathing apparatus. Replacement bottles for the SCBA should be readily available (Denver Fire Department, 1993, p. 15).

Summary

The modern high rise building envelops a large concentration of people, perhaps thousands, engaged in various tasks of living and enterprise. The structure quite likely is

of exceptional architectural design, fulfills an obvious economic need, includes many modern facilities and accouterments, and probably has a combination of fire protection weakness that may lead to unnecessary loss of life sometime in the future when a fire occurs unexpectedly (Mendes, 1975, p. 1).

There is a number of disastrous high rise fires that have been documented. High rise building fires are very dangerous and complex. The literature review indicated that there is a potential for these incidents to take place in the City of Birmingham. The Birmingham Fire and Rescue Service, because of the potential for large loss of live and property damage, must be prepared to handle this type of incident. In determining if the department could handle these types of fires, the critical components of high rise fires must be assessed and the department evaluated on each one.

There is a large body of information on high rise fires. Most departments have policies, procedures, or guidelines on how the department should react. However, this author could find no information on actually evaluating a department's abilities for handling a high rise fire.

PROCEDURES

The research consisted of a literature review, personal interviews, and a survey that was answered by members of the department. Articles and materials were obtained from the National Fire Academy's Learning Resource Center (LRC). Several high rise polices were solicited from other fire departments across the country.

Interviews were conducted with Birmingham Fire and Rescue Service's current Chief of Training James Laster, and the former Chief of Training Forney Howard. The interview with Chief

Laster was held on November 4, 1998. The interview with Chief Howard was on November 10, 1998. Chief Howard was assigned to training from 1989 till 1996, at which time he was transferred to another assignment. The interviews lasted about one hour each. The purpose was to extract information about the amount of high rise fire training, and abilities of the department in that area. Additional interviews were conducted with two downtown battalion chiefs. The interview with Battalion Chief Don Thompson was held on December 2, 1998. It lasted one hour. Another interview with Battalion Chief Tom Armstrong was held on December 3, 1998. It lasted for 45 minutes. The purpose of these interviews was to determine problem areas and high rise firefighting abilities.

A survey instrument (Appendix A) was developed to survey members of the Birmingham Fire and Rescue Service as to the abilities of the department to handle a major high rise fire. Questions asked pertained to rank, knowledge, experience, and training and the perceived abilities of the department. The survey was given to 100 members of the department on November 27 and November 30, 1998. All 100 surveys were returned to the author. A distributor was selected to administer the surveys; the distributor was told to randomly select any fire stations and to tell the members the purpose of the survey. The survey was distributed at each station, filled out, then taken up. The distributor quit when he received 100 surveys. The survey represents about fifteen percent of the department. The data was complied into a data base, analyzed and used to provide information on the research questions.

There were several limitations to the research. The researcher found a quantity of information on high rise fires but none on evaluating a department's abilities to handle one. Also, the author could not find a clearly defined definition of a major high rise fire. Half of a floor on fire was selected because

it would take that amount to severely impact the building and firefighting efforts. Other limitations were the number of members surveyed and the number of questions asked.

This list of terms may help the reader.

1. Incident Management System (IMS) is to provide for a systematic development of a complete, functional command organization designed to allow for single or multi-agency use which increases the effectiveness of command and firefighter safety.

2. Incident Command System (ICS) is an older form of the Incident Management System and is still found in some material.

RESULTS

Do department personnel have the knowledge, experience, and training to successfully use the Incident Management System to handle a major high rise fire?

Chief Howard (1998) stated that, the department started using a formal Incident Command System in 1988. This was followed by intensive training both with outside instructors and department instructors. The department switched to the Incident Management System in 1992. Again intensive training followed. The training was focused at all levels and ranks. After the department was fully trained on the Incident Management System, training continued with tabletop scenario type training. Chief Howard did not remember any particular high rise fire scenarios but stated the scenario would have only pertained to the Incident Management System. Chief Howard also stated that there were some high rise fire films shown but as an addendum to other training.

Chief James Laster (1998) stated since he became Chief of Training the tabletops and other Incident Management System training have continued. Chief Laster also stated that a few high rise

training scenarios have taken place, but they would have only concentrated on the Incident Management System.

Questions #11, #12, and #13 in the survey asked specific questions about the Incident Management System. Question #11 asked if they were familiar with all the terms of the Incident Management System relating to high rise fires. The answers were almost evenly split. Members saying yes were 49% and members saying no 42%. Members saying they do not know were 9%. It should be noted that of the 23 officers surveyed, 19 stated yes, 2 stated no, and 2 stated do not know.

Question #12 asked if they were assigned a job at a high rise fire in the Incident Management System (in line with their rank) would they be comfortable with that role. The majority 71% stated they would. Question #13 asked if they had ever been assigned an Incident Management System role at a high rise fire. The vast majority 92% stated no.

Battalion Chief Don Thompson (1998) stated he has not personally had any problems with anyone not understanding the jobs of the Incident Management System. He feels that using the Incident Management System on all calls and particularly the serious ones is the reason. Battalion Chief, Armstrong (1998) stated that the only problems he encountered were from the shift from Incident Command System to Incident Management System when some of the job title names changed.

After compiling information from these sources, the answer to the research question #1 is yes. However, experience in Incident Management System jobs at an actual high rise fire is dramatically lacking.

Do department personnel have the knowledge, experience, and training to use correct strategies and tactics on a major high rise fire?

Chief Howard (1998) stated that during his tenure at training there was no specific effort toward high rise fire training. There was some high rise fire training in conjunction with other schools, but it was more of a postscript. Mostly films were shown of high rise building fires and the problems the other departments faced.

Chief Laster (1998) stated that there have been no high rise strategies and tactics fire classes since he has been in training. He said it is one of those things that is important but other pressing issues seem to keep getting a higher priority.

Chief Thompson (1998) and Chief Armstrong (1998) both stated that since there have not been any high rise problems, they have not gotten the attention they need. They were not sure if the personnel had the knowledge, experience and training on strategies and tactics. Both agreed that they would like to see high rise training focusing on strategies and tactics.

Survey questions #20 through #25 asked questions about strategies and tactics. On question #20, members that stated by 86%, that they knew three typical ways high rise fires can spread from floor to floor. Question #21 asked if handlines were needed above and below the fire floor. Members correctly stated that handlines were needed by 77%. Question #22 asked if high rise fires can be effectively ventilated; 71% stated yes while 20% were in the do not know column. The officers did much better; 19 of the 23 members stated these fires could be ventilated effectively. Question #23 asked if the strategy for a high rise and other fires is the same. Although the basic strategy, save lives, confine the fire, conserve property, is the same, most members 84% said the strategies were different. The question may be ambiguous, and confusion between strategies and tactics may be the reason for the answers. Question #24 asked is it practical to evacuate all the people from a high rise building on fire.

Members stating yes were 57%, while 21% stated no, and 22% stated do not know. Question #25 asked do you know the control points on the fire floor in a high rise fire. The survey showed 27% stated yes, 47% stated no, and 26% stated do not know.

It is clear that there are no universal or department wide strategies and tactics training classes for high rise fires. Of the people surveyed, 69% state they have not received any formal high rise training. Only 59% state they have read any books about high rise fires. There is very little experience, from which one could draw strategies and tactics knowledge. The survey showed that 81% stated they have never been involved in a major high rise fire. The members surveyed answered most of the questions on strategies and tactics with a degree of knowledge.

The answer to research question #2 is unclear. The answer appears to be no based on training and experience. However, most of the officers (21 out of 23) surveyed stated they have read books on high rise firefighting. Strategies and tactics at high rise fires will mostly be initiated, supervised, and led by officers. For this reason, the answer appears to be yes.

Do department personnel have the knowledge, experience, and training to know the safety issues at a major high rise fire?

It has already been stated there was no specific training in high rise firefighting by the training division. However, Chief Howard (1998) states many of the safety issues at different types of fires are applicable to high rise fires. He goes on to say the Training Division had various types of schools, i.e. firefighter safety and survival, Incident Management System, tabletops, and critiques which had these issues as part of the class. He further states that there are many safety issues which only apply to high rise buildings that were not covered.

Survey questions #15 through #19 asked questions about some of the safety issues. Question #15 asked if you were on an elevator that went to the fire floor and were confronted by heat and smoke, would you know what to do. The majority 81% stated they would know what to do. On question #16, the majority, 79% stated they knew how to use the fire service on an elevator. However, a surprising 75% did not know the difference between Phase I, Phase II, and Phase III types of elevators which deal with fire service safety features on elevators. When asked do you know the equipment that should be carried to the fire floor of a high rise fire, 86% said they did. Question #19 asked when you go into the fire floor, do you know the safety considerations to check on as you advance to the fire. The survey showed 74% stated they knew the safety considerations. The evacuation of civilians is perhaps the largest safety consideration. As already noted in the strategies and tactics question, 57% answered that it was practical to evacuate all people from a high rise building, 21% said no, and 22% said do not know.

The answer to research question #3 is yes, but reluctantly. The main reasons are the answers to the survey, and survey question #19 which shows 91% of the officers surveyed have read books on high rise firefighting. As stated before, the officers will supervise and lead most aspects of a high rise firefighting.

DISCUSSION

While there were no specific literature findings of fire departments evaluating themselves on high rise fires, the literature review clearly showed high rise fires have the makings for disaster. The large loss of life and property damage can be catastrophic. The local fire department will be the primary

defense in high rise buildings on fire; therefore, we must be ready for the challenge. Evaluating for this challenge is something every department with high rise buildings should do.

Mendes (1975) said firefighting is a very practical art. We do what is possible, and we do it as often as we must. Spectacular fires which cause large life or property losses or which, for other reasons, attract considerable professional and lay attention, are not always the best objects for scrutiny and critique when the Chief really is seeking to improve the scope of his operational techniques.

Coffman (1997) stated fire departments that have the responsibility of protecting high rise structures arguably are faced with potential for the most difficult structure fire they could possibly encounter. Thorough, continuous and meticulous study and training of the high rise problem should be on the list of "to do" items for these departments.

Richter (1995) wrote that handling a large scale fire or other emergency in a high rise building is a difficult and complex challenge for any fire department. The inherent factors of these types of buildings present multiple problems which must be overcome.

The author was surprised by many of the positive findings. However, the study also showed, there is immense room for improvement. The survey exhibited that many members had a sound knowledge about high rise fires. One of the most pleasant findings was the large number of officers who on their own initiative had read high rise firefighting books. On the other hand, the 69% of members who indicated they had received no formal high rise training at all was disturbing. The author was not surprised that the survey showed 81% had never been involved in a major high rise fire, and that 92% had never been assigned an incident management role in this type of fire. The three important areas of the research questions that were studied are only a part of the total high rise firefighting picture.

The results of the study indicate that the Birmingham Fire and Rescue Service's abilities to successfully handle these three areas of high rise fires appear to be adequate. When dealing with lives and property, adequate is not satisfactory, and the department as a whole has a lot of work and training to do.

The material showed that there are going to be high rise fires in Birmingham. Luckily there are very few major high rise fires. However, as long as there are high rise fires the fire department will have to deal with them, and we must be prepared to do it well.

RECOMMENDATIONS

The Birmingham Fire and Rescue Service has a satisfactory high rise policy although it needs to be more comprehensive.

It is asking too much for a policy about high rise fires to be all inclusive. A training package that covers all aspects of high rise firefighting needs to be developed. The training package should include sections on: (a) high rise buildings and construction, (b) the incident management system with emphasis on the jobs and their function, (c) communications in high rise buildings, (d) strategies and tactics with specific firefighting operations and details on jobs, (e) rescue, evacuation, and safe refuge areas, (f) support and logistic functions, (g) elevators, (h) air operations, (i) all safety issues for occupants and firefighters.

High rise packets should be developed for each high rise building. They should contain all pertinent information about that particular building. The department already does this with hazardous

material sites. Additional information sheets could be given to lobby control for ascending crews. High rise Incident Management System cue cards could be laminated and given to major job function crews.

Training is paramount for any complex operation. The Training Division should have major involvement in developing high rise firefighting classes. They should cover the total high rise operation. There should be class work, drill field, and drill tower work. Several aspects of training should also take place in the high rise buildings themselves.

The Birmingham Fire and Rescue Service should develop an ongoing program for continued training. This entire package could be incorporated into the training calendar annually.

REFERENCES

Best, R., & Derriers, David P. (1982, January). Fire at the MGM Grand. *Fire Journal, 76,* 19-37.

Birmingham Fire and Rescue Service. (1998, January). *Birmingham Fire and Rescue Service Fire Communications Alarms Report for 1998.* Birmingham, Alabama: Author.

Chapman, Elmer F. (1995, September). Guidelines for Strategic Decision Making at High Rise Fires. *Fire Engineering.* 67-70.

Chubb, M., Jennings, C., & Routley, J. G. (1991, February). *High Rise Office Building Fire, One Meridian Plaza, Philadelphia, Pennsylvania, February 23, 1991* (Report 049). United States Fire Administration, Major Fires Investigation Project. Arlington VA: TriData Corporation.

Coffman, Jefferey B. (1997, May). *Selected Aspects of High Rise Firefighting Operations.* (Executive Fire Officer Research Paper). Emmitsburg, MD: National Fire Academy.

Denver Fire Department. (1993). *High Rise Protocol*. Denver, Colorado: Author.

Dunn, Vincent. (1994, December). Safety and Survival, Elevator Use at High Rise Fires. *Firehouse.* 20 -21.

Hall, John R. (1997, November/December). The Lowdown on High-Rise Fires. *NFPA Journal, 91,* 84-90.

Klem, Thomas J. (1989, May/June). Los Angeles, High Rise Bank Fire. *Fire Journal, 83,* 72-88.

Klem, Thomas J. (1991, February). One Meridian Plaza, Philadelphia, Pennsylvania, Three Firefighter Fatalities, *Preliminary Investigative Report.* Quincy, MA: National Fire Protection Association.

Los Angeles County Fire Department. (1990, November). *High-Rise Incident Emergency Operations: Volume 10, Chapter 6.* Los Angeles, California: Author.

Mendes, Robert F. (1975). *Fighting High-Rise Building Fires, Tactics and Logistics.* Boston, Massachusetts: National Fire Protection Association.

National Fire Service Incident Management System Consortium Model Procedures Committee. (1995). *Model Procedures Guide for Highrise Firefighting* (1st ed.). Stillwater: Oklahoma State University, Fire Protection Publications.

New York City Fire Department. (1974). *Firefighting Procedures Fire Operations: Volume 1. Book 5. High Rise Office Buildings*. New York, New York: New York City Fire Academy.

Olson, D. S. (1996, February). *How Chief Officers can improve Fire Safety in High Rise Buildings*. (Executive Fire Officer Research Paper). Emmitsburg, MD: National Fire Academy.

Richter, Keith B. (1995, August). *Selected Aspects of High Rise Firefighting Operations.* (Executive Fire Officer Research Paper). Emmitsburg, MD: National Fire Academy.

Appendix A
High Rise Survey

Please provide responses to all questions

1. How many years have you been on the department?
   0 - 5 _____ 5 - 10 _____ 10 - 15 _____ 15 - 20 _____ Over 20 _____

2. What is your current rank? Firefighter _____ Apparatus Operator _____
   Lieutenant _____ Captain _____ Battalion Chief or higher _____

3. Do you know the common fire department definition of a high rise building?
   Yes _____ No _____ Not sure _____

4. Do you think our department could have a major high rise fire? Yes _____
   No _____ Don't know _____

5. Have you ever been involved in a major high rise fire? (More than half of a floor)
   Yes _____ No _____ Don't know _____

6. Do you feel the leadership of the department is capable of effectively handling a major high rise fire? Yes _____ No _____ Don't know _____

7. Do you feel the department has enough people to handle a major high rise fire?
   Yes _____ No _____ Don't know _____

8. Have you ever received any formal high rise fire training? Yes _____ No _____
   Don't know _____

9. Have you read any books about high rise firefighting? Yes _____ No _____ Don't know _____

10. Are you familiar enough with our high rise policy to feel comfortable at a major high rise fire? Yes _____ No _____ Don't know _____

11. Are you familiar with all the terms and jobs of the Incident Management System relating to high rise building fires? Yes _____ No _____ Don't know _____

12. If you were assigned any job in the Incident Management System (in line with your rank) at a major high rise fire would you be comfortable with that role? Yes _____
    No _____ Don't know _____

13. Have you ever been assigned an incident management role at a high rise fire?
Yes _____ No _____ Don't know _____

14. If you were trapped on an elevator during a high rise fire do you have the knowledge to get yourself off? Yes _____ No _____ Don't know _____

15. If you were on an elevator that went to the fire floor and was confronted by heat and smoke would you know what to do? Yes _____ No _____ Don't know _____

16. Do you know how to use the fire service in an elevator? Yes _____ No _____ Don't know _____

17. Do you know the difference between a Phase I, Phase II, and Phase III type elevator?
Yes _____ No _____ Don't know _____

18. Do you know the equipment that should be carried to the fire floor of a high rise fire?
Yes _____ No _____ Don't know _____

19. When you go into the fire floor do you know the safety considerations to check on as you advance to the fire? Yes _____ No _____ Don't know _____

20. Do you know at least three typical ways which high rise fires can spread from floor to floor?
Yes _____ No _____ Don't know _____

21. Do you need handlines above and below the fire floor? Yes _____ No _____ Don't know _____

22. Can high rise fires be effectively ventilated? Yes _____ No _____
Don't know _____

23. Is the strategy for a high rise fire and other fires the same? Yes _____ No _____
Don't know _____

24. Is it practical to evacuate all the people from a high rise building on fire? Yes _____
No _____ Don't know _____

25. Do you know the control points on the fire floor in a high rise fire? Yes _____
No _____ Don't know _____

APPENDIX B
HIGH RISE SURVEY ANSWERS

Question #1 How many years have you been on the department?

0-5 32 5-10 13 10-15 28 15-20 6 Over 20 21

Question #2 What is your current rank?

FF 61 A/O 16 Lt. 13 Capt. 4 Battalion Chief or higher 6

Question #3 Do you know the common fire department definition of a high rise building?

	Yes	No	Not Sure
FF	51	2	8
AO	11	0	5
Lt	13	0	0
Capt	4	0	0
Chief	5	1	0
Total FF	62	2	13
Total Officer	22	1	0
Totals	84	3	13

Question #4 Do you think our department could have a major high rise fire?

	Yes	No	Don't Know
FF	60	0	1
AO	15	0	1
Lt	13	0	0
Capt	4	0	0
Chief	6	0	0
Total FF	75	0	2
Total Officer	23	0	0
Totals	98	0	2

Question #5 Have you ever been involved in a major high rise fire? (More than half of a floor)

	Yes	No	Don't Know
FF	8	53	0
AO	4	12	0
Lt	4	9	0
Capt	0	4	0
Chief	3	3	0
Total FF	12	65	0
Total Officer	7	16	0
Totals	19	81	0

Question #6 Do you feel the leadership of the department is capable of effectively handling a major high rise fire?

	Yes	No	Don't Know
FF	25	21	15
AO	5	5	6
Lt	6	4	3
Capt	2	0	2
Chief	3	3	0
Total FF	30	26	21
Total Officer	11	7	5
Totals	41	33	26

Question #7 Do you feel the department has enough people to handle a major high rise fire?

	Yes	No	Don't Know
FF	38	15	8
AO	7	5	4
Lt	6	7	0
Capt	3	0	1
Chief	4	2	0
Total FF	45	20	12
Total Officer	13	9	1
Totals	58	29	13

Question #8 Have you ever received any formal high rise fire training?

	Yes	No	Don't Know
FF	16	42	3
AO	2	13	1
Lt	5	7	1
Capt	1	3	0
Chief	2	4	0
Total FF	18	55	4
Total Officer	8	14	1
Totals	26	69	5

Question #9 Have you read any books about high rise firefighting?

	Yes	No	Don't Know
FF	28	32	1
AO	10	6	0
Lt	11	2	0
Capt	4	0	0
Chief	6	0	0
Total FF	38	38	1
Total Officer	21	2	0
Totals	59	40	1

Question #10 Are you familiar enough with our high rise policy to feel comfortable at a major high rise fire?

	Yes	No	Don't Know
FF	24	29	8
AO	9	5	2
Lt	4	6	3
Capt	4	0	0
Chief	4	2	0
Total FF	33	34	10
Total Officer	12	8	3
Totals	45	42	13

Question #11 Are you familiar with all the terms and jobs of the Incident Management System relating to high rise building fires?

	Yes	No	Don't Know
FF	22	34	5
AO	8	6	2
Lt	9	2	2
Capt	4	0	0
Chief	6	0	0
Total FF	30	40	7
Total Officer	19	2	2
Totals	49	42	9

Question #12 If you were assigned any job in the Incident Management System (in line with your rank) at a major high rise fire would you be comfortable with that role?

	Yes	No	Don't Know
FF	36	16	9
AO	14	2	0
Lt	11	1	1
Capt	4	0	0
Chief	6	0	0
Total FF	50	18	9
Total Officer	21	1	1
Totals	71	19	10

Question #13 Have you ever been assigned an incident management role at a high rise fire?

	Yes	No	Don't Know
FF	3	57	1
AO	0	16	0
Lt	1	12	0
Capt	0	4	0
Chief	3	3	0
Total FF	3	73	1
Total Officer	4	19	0
Totals	7	92	1

Question #14 If you were trapped on an elevator during a high rise fire do you have the knowledge to get yourself off?

	Yes	No	Don't Know
FF	41	11	9
AO	11	2	3
Lt	12	0	1
Capt	3	1	0
Chief	4	1	1
Total FF	52	13	12
Total Officer	19	2	2
Totals	71	15	14

Question #15 If you were on an elevator that went to the fire floor and was confronted by heat and smoke would you know what to do?

	Yes	No	Don't Know
FF	50	9	2
AO	13	1	2
Lt	9	2	2
Capt	4	0	0
Chief	5	1	0
Total FF	63	10	4
Total Officer	18	3	2
Totals	81	13	6

Question #16 Do you know how to use the fire service in an elevator?

	Yes	No	Don't Know
FF	47	11	3
AO	11	2	3
Lt	11	2	0
Capt	4	0	0
Chief	6	0	0
Total FF	58	13	6
Total Officer	21	2	0
Totals	79	15	6

Question #17 Do you know the difference between a Phase I, Phase II, and Phase III type elevator?

	Yes	No	Don't Know
FF	6	44	11
AO	1	14	1
Lt	1	10	2
Capt	0	3	1
Chief	2	4	0
Total FF	7	58	12
Total Officer	3	17	3
Totals	10	75	15

Question #18 Do you know the equipment that should be carried to the fire floor of a high rise fire?

	Yes	No	Don't Know
FF	52	5	4
AO	14	1	1
Lt	12	1	0
Capt	3	0	1
Chief	5	1	0
Total FF	66	6	5
Total Officer	20	2	1
Totals	86	8	6

Question #19 When you go into the fire floor do you know the safety considerations to check on as you advance to the fire?

	Yes	No	Don't Know
FF	47	6	8
AO	8	2	6
Lt	9	1	3
Capt	4	0	0
Chief	6	0	0
Total FF	55	8	14
Total Officer	19	1	3
Totals	74	9	17

Question #20 Do you know at least three typical ways which high rise fires can spread from floor to floor?

	Yes	No	Don't Know
FF	52	5	4
AO	12	2	2
Lt	13	0	0
Capt	4	0	0
Chief	5	1	0
Total FF	64	7	6
Total Officer	22	1	0
Totals	86	8	6

Question #21 Do you need handlines above and below the fire floor?

	Yes	No	Don't Know
FF	47	7	7
AO	14	0	2
Lt	8	1	4
Capt	3	0	1
Chief	5	1	0
Total FF	61	7	9
Total Officer	16	2	5
Totals	77	9	14

Question #22 Can high rise fires be effectively ventilated?

	Yes	No	Don't Know
FF	45	6	10
AO	7	1	8
Lt	13	0	0
Capt	2	0	2
Chief	4	2	0
Total FF	52	7	18
Total Officer	19	2	2
Totals	71	9	20

Question #23 Is the strategy for a high rise fire and other fires the same?

	Yes	No	Don't Know
FF	5	51	5
AO	0	15	1
Lt	0	13	0
Capt	4	0	0
Chief	1	5	0
Total FF	5	66	6
Total Officer	5	18	0
Totals	10	84	6

Question #24 Is it practical to evacuate all the people from a high rise building on fire?

	Yes	No	Don't Know
FF	41	10	10
AO	5	3	8
Lt	8	3	2
Capt	1	1	2
Chief	2	4	0
Total FF	46	13	18
Total Officer	11	8	4
Totals	57	21	22

Question #25 Do you know the control points on the fire floor in a high rise fire?

	Yes	No	Don't Know
FF	14	30	17
AO	2	8	6
Lt	4	6	3
Capt	3	1	0
Chief	4	2	0
Total FF	16	38	23
Total Officer	11	9	3
Totals	27	47	26